

THE COCCOIDEA (HOMOPTERA) NATURALIZED IN SOUTH AUSTRALIA: AN ANNOTATED LIST

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[Read 14 June 1956]

SUMMARY

This paper brings together previously published records of scale insects that have become naturalized in South Australia; it does not consider indigenous species. It also includes species identified by the author, but not previously recorded as occurring in the State. Of these, *Odontaspis ruthae* Ehrhorn, *Pseudococcus malacearum* Ferris, *Tridiscus distichlii* (Ferris), and *Eriococcus coccineus* Cockerell, are reported from Australia for the first time. A list is also given of species identified from material submitted by quarantine services in this State.

INTRODUCTION

Towards the end of the 19th century several workers made collections of Australian Coccoidea and described many new species. The first catalogue of the Australian scales was published by Maskell (1895), which was followed by that of Lidgett (1899). Froggatt (1914-1921) produced a series of papers in the Agricultural Gazette of New South Wales, which contained descriptions of new species and also referred to some exotic scales known to be established in Australia. This monograph was reprinted, with some additions, as Science Bulletins Nos. 14, 18 and 19 of the Department of Agriculture of New South Wales. Few specific references exist in the literature to scales occurring in South Australia.

This paper lists the introduced scales identified by the writer in the course of several years' work with the group. Most of these had not been reported previously from South Australia, and four species appear to be new to Australian records. In addition, some earlier published references have been included. Notes on hosts and economic status are given. A list is also appended of scales upon imported plants and fruit, and which were submitted for identification by quarantine authorities.

The classification used is that of Ferris (1950a, 1955a). Where available, the following citations are given for each species: the original description; its first recorded occurrence in Australia; the first recorded occurrence in South Australia; and the most recently used synonym in the Australian literature. The common names are those used in Gay's list (1955).

Specimens were examined after treatment with 10 per cent. aqueous potassium hydroxide, and staining with basic or acid fuchsin; they were mounted in "Sira", a neutral synthetic medium, or in Mohr and Wehrle's medium.

Family DIASPIDIDAE

Aonidiella aurantii (Maskell, 1879)

Aspidiotus aurantii Maskell, 1879. Trans. N.Z. Inst., 11, p. 199. On oranges and lemons imported into New Zealand from Sydney.

Aspidiotus aurantii Mask. Anon., Rep. Minister of Agric., S. Aust., 1912-1913.

Chrysomphalus aurantii Maskell. Davidson, J., 1931. J. Dep. Agric., S. Aust., 34, p. 744. Recorded at Berri in 1929.

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RED SCALE.

Host-plants:

Aonidiella aurantii (Mask.) is the commonest scale on *Citrus* spp. in this State. It occurs on the leaves and fruit throughout the year. In commercial orchards of the irrigated areas of the Lower River Murray Valley it has become a serious pest. In some of these orchards a few isolated trees of *Juglans regia* L. (walnut) and *Prunus domestica* L. (European plum) at Younghusband, and *Pyrus communis* L. (pear) at Mypolonga have become heavily infested with *A. aurantii*. In the citrus orchards of the Upper Murray Valley red scale is confined to restricted outbreak areas by means of regular, drastic control measures (Botham, 1955).

A. aurantii has been identified from the following additional hosts in South Australia: *Coprosma retusa* Petrie (looking-glass plant), *Foeniculum vulgare* Hill (fennel), *Ilex aquifolium* L. (English holly), *Laurus nobilis* L. (laurel), *Rosa* spp. (cultivated roses) *Pyrus malus* L. (apple), and *Vitis vinifera* L. (grape-vine).

Aonidiella citrina (Coquillett, 1891)

Aspidiotus aurantii var. *citrina* Coquillett, 1891. U.S.D.A., Div. Ent., Bull. 23, pp. 19-30.

Aspidiotus citrina Coquillett. Anon., 1940. Agric. Gaz. N.S.W., 51 (6), p. 346.

On *Citrus* in the coastal regions of New South Wales where it has been known for several years as a form of *A. aurantii*.

YELLOW SCALE.

Host-plants:

Aonidiella citrina was first recognized in South Australia in 1946 at Waikerie, on the River Murray. It was found on leaves and fruit of *Citrus grandis* Osbeck (grape fruit) and *Citrus sinensis* Osbeck (Valencia orange). The leaves of a grape-vine that were in contact with the orange were also infested. At Berri, Loxton and Mypolonga it occurred on the leaves and fruit of orange. After treatment of these localized outbreaks *A. citrina* was not seen in South Australia until June, 1956, when specimens were identified from an occurrence involving a single orange tree at Waikerie.

Aspidiotus hederae (Vallot, 1829).

Chermes hederae Vallot, 1829. Mem. Acad. Dijon, pp. 30-33, 1829. [Not seen.]

Aspidiotus nerii Bouché. Maskell, W. M., 1882. Trans. N.Z. Inst., 14, p. 217. On *Citrus*, oleander and *Acacia* from all States of Australia.

Aspidiotus hederae Vallot. Froggatt, W. W., 1914. Agric. Gaz. N.S.W., 25 (4), p. 314. This species was reported to infest all kinds of plants, shrubs and forest trees. Although lemons imported from Italy into Sydney were heavily infested, Froggatt had never seen *A. hederae* in an orchard.

OLEANDER SCALE.

Host-plants:

In South Australia this scale is commonly found on *Citrus* spp., both in commercial orchards and home gardens: *C. grandis* Osbeck (fruit), Berri and Waikerie; *C. sinensis* Osbeck (fruit), Berri, Holder and Renmark. Other observed hosts include *Olea europaea* L. (olive), Glen Osmond; *Nerium oleander* L. (oleander), Glen Osmond; *Ribes rubrum* L. (red currant), Stirling West; *Ceratonia siliqua* L. (carob), Waikerie; *Morus nigra* L. (mulberry), Renmark.

A. hederae is not regarded as a serious pest. It may cause persistent green patches around scales on ripening citrus fruits.

Aulacaspis rosae (Bouché, 1834)

Aspidiotus rosae Bouché, 1834. Naturgeschichte der Insekten. Erste Lieferung, 1-5, pp. 1-216. Nicolai, Berlin. [Not seen.]

Diaspis (Aulacaspis) rosae Bouché. Froggatt, W. W., 1914. Agric. Gaz. N.S.W., 25 (10), p. 881.

ROSE SCALE.

Host-plant:

Rosa spp. On cultivated roses (stems) in the Adelaide district, but appears to cause little, if any, damage.

Diaspis boisduvali (Signoret, 1869)

Diaspis boisduvali Signoret, 1869. Ann. Soc. Ent. Fr. (4), 9, p. 432.

Diaspis boisduvali Signoret. Maskell, W. M., 1895. Trans. N.Z. Inst., 27, p. 44. On *Cattleya* sp. and *Dendrobium* sp. in a hot-house at Adelaide.

Host-plant:

On orchid bulbs at Adelaide, 1951.

Ischnaspis longirostris (Signoret, 1882)

Mytilaspis longirostris Signoret, 1882. Bull. Soc. ent. Fr., pp. 35-36. [Not seen.]

Ischnaspis filiformis Douglas. Maskell, W. M., 1895. Trans. N.Z. Inst., 27, p. 52. On palms in hot-houses at Adelaide.

This appears to be the only reported occurrence of this scale in South Australia; it has not been seen by the author.

Lepidosaphes beckii (Newman, 1869)

Coccus beckii Newman, 1869. Entomologist, 4, p. 217. [Not seen.]

Mytilaspis citricola Packard. Green, E. E., 1914. Bull. ent. Res., 5, p. 233. On *Citrus acida* Roxb. (lime) at Botanic Gardens, Darwin, Northern Territory.

PURPLE SCALE.

Host-plants:

This species occurs mainly on *Citrus* spp. in New South Wales and Queensland. Froggatt (1914b) states that Maskell identified purple scale as *Mytilaspis citricola* on *Croton* sp. from Adelaide. It has not been found by the writer. *Croton* is grown in Adelaide as a hot-house plant.

Lepidosaphes tokionis (Kuwana, 1902)

Lepidosaphes newsteadi var. *tokionis* Kuwana, 1902. Proc. Calif. Acad. Sci. (3), 3 (2), pp. 43-98. [Not seen.]

Mytilaspis auriculata Green. Froggatt, W. W., 1914. Agric. Gaz. N.S.W., 25 (7), p. 606. On *Croton* sp. in the Botanic Garden, Adelaide. Recorded from South Australia only on the basis of this report; not seen by the writer.

Lepidosaphes ulmi (Linnaeus, 1758)

Coccus ulmi Linnaeus, 1758. Syst. Nat. Ed. 10, 1, p. 455. [Ferris (1937) states that the synonymy of this species is much confused; briefly, it is *Coccus ulmi* of Linnaeus; *Aspidiotus pomorum* of Bouché, which became *Mytilaspis pomorum* (Bouché) of Signoret and later authors.]

Mytilaspis pomorum (Bouché). Fuller, C. W., 1899. Trans. ent. Soc. Lond., 1899, pp. 435-473. On apple, Mt. Barker, Western Australia.

Lepidosaphes ulmi Linn. Davidson, J., 1931. J. Dep. Agric. S. Aust., 34, p. 744. Recorded on old apple trees in the Mount Gambier district.

MUSSEL SCALE.

Host-plant:

Pyrus malus L. (apple). Froggatt (1914a) implied that mussel scale was present in South Australia when he stated that it was "all over the orchards of Australia, found usually upon the bark or trunk of the tree or the young branches . . ." In July, 1954, *L. ulmi* was identified from Crafers, Mt. Lofty Ranges; this was a heavy infestation of the fruit of one tree. Mussel scale is reported to be confined to a few gardens in the cooler districts, where it is not a pest. (Anon., 1940.)

Odonaspis ruthae Ehrhorn, 1907

Odonaspis ruthae Ehrhorn, 1907. 2nd. Bienn. Rep. Hort. Calif., p. 26. [Not seen.]

Odonaspis ruthae Ehrhorn. Balachowsky, A. S., 1953. Les Cochenilles, 7, p. 21. Hermann, Paris.

Host-plants:

Cynodon dactylon (L.) (couch grass), Adelaide (1952); Wallaroo. The scale is distributed over the sheathing leaf-bases, stolons and roots. *Sorghum halipense* (L.) (Johnson grass), Adelaide.

This is the first record of *O. ruthae* in Australia.

Quadraspidotus ostreaeformis (Curtis, 1843)

Aspidiotus ostreaeformis Curtis, 1843. Gard. Chron., 3, p. 805. [Not seen.]

Aspidiotus ostreaeformis. Evans, J. W., 1942. Tasmanian J. Agric. 13 (4), p. 158. On apple and other hosts in Tasmania.

OSTER-SHELL SCALE.

Host-plant:

Pyrus malus L.

Quadraspidotus ostreaeformis was identified for the first time in South Australia from Cudlee Creek in May, 1948; field observations indicate that it is well established and presumably has been present for many years. It was later seen to be lightly but widely distributed on the bark of apple trees in commercial orchards in the Mount Lofty Ranges. In 1954, a heavy infestation was seen at Balhannah; this was confined to the older limbs of two trees (Granny Smith variety) about twenty years old, and had apparently killed the affected limbs. *Q. ostreaeformis* occurs occasionally on twig-growth and fruit, but principally on old trees, sheltering beneath surface bark.

An allied species, *Quadraspidotus perniciosus* (Comstock), the San José scale, is not known to occur in South Australia although references have occasionally been made in the Australian literature to its presumed occurrence here. Froggatt (1914c) inferred its presence in this State when he recorded *Aspidiotus perniciosus* as a serious pest on bark, foliage and fruit of pome and stone fruits. He stated that it "has been spread all over the Australian States with nursery stocks". Maskell (1896) recorded a heavy infestation of *A. perniciosus* on twigs of *Eucalyptus corynocalyx* collected at Adelaide. However, Cockerell (1897) stated, with reference to South Australia that he was "quite convinced that the supposed variety of *perniciosus* recorded by Maskell as on *Eucalyptus* in Australia is not that insect; the description reads more like *A. forbesi*, but it is very likely something else". A comprehensive bibliography of San José scale in Australia between 1892 and 1898 is given by Tryon (1898).

Family COCCIDAE (LECANIIDAE)

Coccus hesperidum Linnaeus, 1758

Coccus hesperidum Linnaeus, 1758. Syst. Nat. 10th Ed., p. 455.

Lecanium hesperidum Linnaeus. Maskell, W. M., 1893. Trans. N.Z. Inst., 27, p. 15. On *Citrus* and *Laurus* in Australia.

Lecanium hesperidum Linn. Davidson, J., 1931. J. Agric. S. Aust., 34, p. 744. On orange trees at Gawler, South Australia, in 1929.

SOFT BROWN SCALE.

Host-plants:

Coccus hesperidum is widely distributed on *Citrus* spp. in South Australia. It has a wide range of hosts, especially cultivated plants. It has been identified on *Sideroxylon australis* Benth. et Hook (scrub crab-apple) at the Waite Institute Arboretum. Green (1904) considers that his species *Lecanium signiferum* differs from *C. hesperidum* principally in coloration and may be merely a well-marked variety. This form of *C. hesperidum* was identified on *Eugenia pendula* D.C. (lilly-pilly), *Laurus nobilis* L. and *Sideroxylon australis* at the Waite Institute.

***Eucalymnatus tessellatus* (Signoret, 1873)**

Lecanium tessellatum Signoret, 1873. Ann. Soc. Ent. Fr. (5) 3, pp. 395-448.

Lecanium tessellatum Signoret. Maskell, W. M., 1893. Trans. N.Z. Inst., 25, p. 219. On *Laurus nobilis* at Sydney, New South Wales. Maskell, W. M., 1895. Trans. N.Z. Inst., 27, pp. 35-75. On palms in hot-houses, Adelaide, South Australia.

Host-plants:

In the Adelaide district *E. tessellatus* has been identified from *Brachychiton* spp., *Ilex aquifolium* L., *Sterculia* sp., and on *Phoenix humilis* Royle at the Botanic Garden, Adelaide. It is of no economic importance under South Australian conditions.

***Eulecanium persicae* (Fabricius, 1776)**

Lecanium berberidis Schrank. Maskell, W. M., 1897. Trans. N.Z. Inst., 29, p. 311. On grape-vines at Melbourne, Victoria.

Lecanium persicae F. Anon., 1940. J. Dep. Agric., S. Aust., 43 (9), p. 640. On grape-vines in South Australia.

VINE SCALE.

Host-plants:

Of widespread occurrence on *Vitis vinifera* L.; *Parthenocissus tricuspidata* Planch (Virginia creeper) and *Hedera helix* L. (ivy) at Adelaide. The adult female scales of *E. persicae* are usually found to be heavily parasitized by wasps.

***Eulecanium pruinorum* (Coquillett, 1891)**

Lecanium pruinorum Coquillett, 1891. Insect Life, 3, pp. 382-384.

Lecanium pruinorum. Anon., 1935. Agric. Gaz. N.S.W., 46 (6), p. 328.

Eulecanium pruinorum. Anon., 1948. Insect Pest Survey for 1948, N.S.W. Dep. Agric., pp. 5, 7, 9.

FROSTED SCALE.

Host-plants: The soft stone-fruits.

This species was identified in South Australia for the first time in October, 1954. It was found on the wood of plum trees in several orchards in the Mount Lofty Ranges. At Balhannah at least three trees in one orchard were heavily infested, there being about 25 adult females per foot of branch. In the Barossa district, north of Adelaide, the scales were densely clustered along the spurs of apricot trees during November when eggs were being laid. *E. pruinorum* was not reported as a pest from these areas during the following year.

***Saissetia hemisphaerica* (Targioni-Tozzetti, 1867)**

Lecanium hemisphaericum Targioni-Tozzetti, 1867. Mem. Soc. italiana Sci. Nat. 3 (3), pp. 1-81. [Not seen.]

Lecanium hemisphaericum. Maskell, W. M., 1895. Trans. N.Z. Inst., 27, p. 59. On *Eranthemum variegatum* at Adelaide.

Saissetia coffeae Walker. Anon., 1951. Insect Pest Survey for 1951, N.S.W. Dep. Agric.

HEMISPHERICAL SCALE.

Host-plants:

Asplenium sp., *Eranthemum variegatum* at Adelaide, *Cycas revoluta* Thunb. at the Botanic Garden, Adelaide. In this State *S. hemisphaerica* is principally a pest of ferns in shade-houses.

***Saissetia nigra* (Nietner, 1861)**

Lecanium nigrum Nietner, 1861. Ceylon Times, p. 9 (1861). [Not seen.]

Lecanium nigrum Nietner var. *depressum*. Maskell, W. M., 1894. Trans. N.Z. Inst., 26, p. 73.

Saissetia nigra. Simmonds, H. W., 1951. J. Dep. Agric. S. Aust., 54 (8), p. 398.

NIGRA SCALE.

Host-plants:

Daphne odora Thunb. and *Nerium oleander* L. at Adelaide; *Ilex aquifolium* L. in the Adelaide district and Mt. Lofty Ranges; *Osteospermum moniliferum* L., National Park, Belair.

Saissetia oleae (Bernard, 1782)

Chermes oleae Bernard, 1782. Mem. d'Hist. Nat. Acad., Marseille, p. 108 (1782). [Not seen.]
Lecanium oleae Bern. Froggatt, W. W., 1897. Agric. Gaz. N.S.W., 8, p. 532. Recorded as a common species in Sydney gardens.
Saissetia (*Lecanium*) *oleae* Bern. Quinn, G., 1916. J. Dep. Agric. S. Aust. 19 (11), p. 979. On orange in South Australia.

BLACK SCALE.

Host-plants:

Citrus spp. Quinn (*loc. cit.*) first recorded *S. oleae* in South Australia as a pest on the leaves and woody parts of orange trees. It may become numerous enough to cause loss of fruit in commercial orchards. In the Adelaide district small, localized outbreaks, sometimes severe, may occur from time to time.

Simmmonds (1951) described the life-history of *S. oleae* in South Australia and discussed the part played by predators and parasites in limiting the numbers of black scale on *Citrus* and *Olea europea* Linn. (olive).

Black scale has been identified in the Adelaide district on *Nerium oleander* L., *Duranta plumieri* Jacq. (sky-flower), *Crataegus* sp. (hawthorn), *Erica* sp. (heath), *Sterculia* sp., *Hedera helix* L., *Calodendrum capense* Thunb. (Cape chestnut), *Solanum nigrum* L. (nightshade), and *Wahlenbergia gracilis* (Forst. f.) A.D.C. (Australian bluebell).

Family PSEUDOCOCCIDAE

Planococcus citri (Risso, 1813)

Dortheesia citri Risso, 1813. Essai Hist. Nat. des Oranges, etc., Paris, 1813. [Not seen.]
Pseudococcus citri (Risso). Carter, W., 1942. J. econ. Ent., 35 (1), p. 14. On *Ananas comosus* (L.) (pineapple), Queensland.
Planococcus citri (Risso). Ferris, G. F., 1950. Atlas of the Scale Insects of North America, 5, p. 165. Stanford Univ. Press, Calif.

CITRUS MEALY BUG.

Host-plants:

Coleus sp., *Croton* sp., *Clerodendrum* sp., and *Erythrina* sp. growing in a hot-house at the Botanic Garden, Adelaide; *Ceratonla siliqua* L. (leaves and fruit) and on the inflorescence of *Veronica* sp., both growing in the open, Adelaide.

In this State *Planococcus citri* is a serious pest of plants grown in hot-houses and shade-houses, but has been found living in the open only once.

Pseudococcus adonidum (Linnaeus)

Dactylopius adonidum L. Maskell, W. M., 1896. Trans. Proc. N.Z. Inst., 28, p. 399. On *Acacia linifolia* at Sydney, New South Wales. This is the earliest published record of this species' occurrence in Australia, but it is likely that the specimens were misidentified because Maskell himself noted some reservations about their identity.
Pseudococcus longispinus Targioni. Halliday, O. E., 1940. J. Dep. Agric. S. Aust., 43 (12), p. 847. On *Citrus* in the River Murray settlements. This is the first published record of this species in South Australia.

LONG-TAILED MEALY BUG.

Host-plants:

In South Australia *Pseudococcus adonidum* occurs on a wide range of host-plants growing both in the open and in hot-houses.

Ps. adonidum is the mealy bug most commonly found on *Citrus* spp., pears and grape-vines in the commercial orchards of the River Murray irrigation areas, where it is a serious pest. The damage is caused by species of fungus that develop in the honey dew secreted by the insects. In navel oranges the mealy bugs aggregate at the navel end of the fruit. Oranges grown for the local market are sometimes rendered unsalable due to an unsightly deposit on the rind caused by development of sooty mould. More serious loss may be caused by

development of a grey-green mould at the navel end of apparently clean fruit during storage and transport. The market value of Valencia oranges, which grow in bunches, is affected by development of a sooty mould on the rind where one fruit is in contact with another. In pears a grey-green mould develops when a drop of honey dew is secreted at the calyx end of the fruit, causing breakdown. The stickiness of honey dew on the surface of grapes hinders the drying process.

Ps. adonidum has been identified on the following additional hosts in the Adelaide district: *Achillea millefolium* L. (milfoil) and *Asplenium* sp.; *Cebara* sp. and *Erythrina* sp. grown in a hot-house at the Botanic Garden; *Nerium oleander* L. and *Tradescantia virginiana* L. (spiderwort) at the Waite Institute; near the core of a rotting fruit of *Cydonia oblonga* Mill. (quince); *Vitis vinifera* L. (zante currant).

***Pseudococcus malacearum* Ferris, 1950**

Pseudococcus malacearum Ferris, 1950. Atlas of the Scale Insects of North America, 5, p. 185. Stanford Univ. Press, Calif.

Host-plants:

Cucurbita pepo L. (pumpkin) at Waikerie (coll. T. O. Browning). Pumpkins which had been harvested and stored in a shed were found to be heavily infested with all stages of this mealy bug in October, 1955. This is a "long-tailed" species, the posterior wax filaments being half as long as the body. The females produce an ovisac that is loose and fluffy at first, but which becomes compact and elongated by the time all the eggs have been laid.

Passiflora edulis Sims (passion-fruit) and *Passiflora mollissima* Bailey (banana passion-fruit) at Adelaide. A heavy infestation killed the vines of both host-plants.

Tragopogon porrifolius L. (salsify) at Adelaide. Adult females were living on the roots in December, when large numbers of eggs were being laid.

The specimens from *Passiflora* and *Tragopogon* from Adelaide, together with some living on the roots of *Medicago sativa* L. (lucerne) and *Melilotus alba* Desr. (Bokhara clover) from Cardross, Victoria (coll. W. J. Webster), were identified by Dr. Harold Morrison as *Pseudococcus malacearum* Ferris, with certain reservations. He did not have for comparison the type of *Ps. malacearum*, but in his opinion these specimens appeared to be identical with presumed holotypes in the United States National Collection of Coccidae at Washington, D.C.

These specimens represent the first record of *Pseudococcus malacearum* Ferris in Australia.

***Tridiscus distichlii* (Ferris)**

Ferris, G. F., 1950. Atlas of the Scale Insects of North America, 5, p. 249. Stanford Univ. Press, Calif.

Host-plant:

Triticum vulgare Villars (wheat), Adelaide. In March and April, 1952, all stages of this mealy bug were found among the sheathing bases of the leaves of wheat which was being grown for experimental purposes in a glass-house at the Waite Institute. The eggs are laid in quick succession so that one egg adheres to the one preceding in "string of beads" fashion. An amorphous, fluffy ovisac is produced.

This is the first record of *T. distichlii* in Australia.

Family ASTEROLECANIIDAE

***Asterolecanium variolosum* (Ratzeburg, 1870)**

Coccus variolosus Ratzeburg, 1870. Tharandter Forst. Jahrb. 20, pp. 187-194. [Not seen.]

Asterolecanium variolosum (Ratz.), Russell, L. M., 1941. U.S.D.A. Misc. Publ., 424, p. 219.

On *Quercus sideroxyla* at Botanic Garden, Sydney. (Specimens from W. W. Froggatt, No. 18.)

GOLDEN OAK SCALE.

Host-plants:

Quercus spp.

A. variolosum was identified on *Quercus* sp. from Mt. Lofty in 1940.

Family DACTYLOPIIDAE.

Eriococcus araucariae Maskell, 1879

Eriococcus araucariae Maskell, 1879. Trans. N.Z. Inst. 11, 218.

Eriococcus araucariae Mask. Froggatt, W. W., 1916. Agric. Gaz. N.S.W., 27 (6), p. 427.

On *Araucaria excelsa* R. Br. (Norfolk Island pine) at Sydney, and *A. araucariae* var. *minor* Maskell on *Kunzia capitata* at Sydney.

Host-plant:

E. araucariae was identified on *Araucaria cunninghamii* Aiton (hoop-pine) at the Waite Institute in 1956.

Eriococcus coccineus Cockerell, 1894

Eriococcus coccineus Cockerell, 1894. Ent. News, 5 (6), 43. [Not seen.]

Host-plant:

This species has been identified from several species of Cactaceae growing in a home-garden at Adelaide in 1952. The female scales adhere to the spines of the host.

This is the first record of *E. coccineus* from Australia.

Dactylopius indicus Green, 1908

Coccus indicus Green, 1908. Mem. Dep. Agric. Ind. ii, 2, p. 28. [Not seen.]

Dactylopius (Coccus) indicus. Anon., 1925. 1st Ann. Rep. Qd. Prickly Pear Land Commiss., 1924-25, pp. 19-28. Recorded as having given effective control of *Opuntia* spp. in Queensland during the previous four years.

Dactylopius ceylonicus Green, *indicus* Green. Anon., 1936. J. Dep. Agric. S. Aust., 40 (5), pp. 404-410. Introduction of *Dactylopius indicus* to South Australia in 1934.

Dactylopius indicus. Tough, W. A., 1938. S. Aust. Nat., 19 (1), pp. 7-9. Recorded the successful eradication of *Opuntia vulgaris* by *D. indicus* at Pooraka, South Australia.

Dactylopius ceylonicus. Dodd, A. P., 1940. The biological campaign against prickly-pear. Comm. Prickly Pear Board, Brisb. The most recent account of all aspects of the biological control of prickly-pear by cochineal insects.

PRICKLY-PEAR COCHINEAL INSECT.

Host-plants:

Opuntia spp.

Several species of *Opuntia* that have been grown as garden ornamentals or hedge plants have escaped locally from cultivation to form thickets at various places in South Australia. *Opuntia* has nowhere become naturalized other than as small, isolated patches of this kind. Cochineal insects obtained from Queensland through A. P. Dodd, Officer-in-Charge of all Investigations of the Commonwealth Prickly Pear Board, have been used by the Department of Agriculture to control these occurrences. The species principally used has been *D. indicus* Green, but a second species (near *confusus* Cockerell) has also been identified from material obtained from the same source.

A sample of mealybugs taken from *Opuntia vulgaris* Miller (= *O. monacantha* Haworth of Black (1948)) at McLaren Flat, March, 1956, was identified as *Dactylopius indicus* Green. This species was first used to control *O. vulgaris* in 1934, when a colony was obtained from Queensland (Anon., 1936, *loc. cit.*) and liberated upon a stand one-quarter mile long, which had originally been planted as a hedge. Within four years it had been completely killed (Tough, 1938, *loc. cit.*). Since that time, *D. indicus* has been distributed to other small localized escapes of *O. vulgaris*.

Dactylopius sp. (near confusus Cockerell, 1893)

Material collected on *Opuntia megacantha* Salm-Dyck from Yatina, South Australia, March, 1956 (coll. G. Young), closely resembles *D. confusus* Cockerell as defined by Ferris (1955b). The original introduction was made with material obtained from the Commonwealth Prickly Pear Board, Queensland.

ACKNOWLEDGMENTS

The author is greatly indebted to Dr. Harold Morrison of the Insect Identification and Parasite Introduction Section, Agricultural Research Service, United States Department of Agriculture, for identification of the mealybug *Pseudococcus malacearum* Ferris. Mr. E. H. Zeck, Entomologist, Department of Agriculture, New South Wales, identified the diaspidid scale *Quadraspidiotus ostreaeformis* (Curtis). She would also like to acknowledge her appreciation of discussions with the following: Mr. A. Musgrave, Entomologist, Australian Museum, Sydney, on matters of nomenclature; Miss C. M. Eardley, Systematic Botanist, University of Adelaide, identity of host-plants; Mr. D. T. Kilpatrick and Mr. H. E. Orchard of the South Australian Department of Agriculture, on field observations on some of the scale insects and on cochineal insects respectively.

**SPECIES SUBMITTED FOR IDENTIFICATION FROM QUARANTINE
INSPECTIONS OF IMPORTED PLANTS IN SOUTH AUSTRALIA**

Family DIASPIDIDAE

- Aonidiella orientalis* (Newstead) on fruit of *Asimina triloba* Dunal (pawpaw) from Darwin, Northern Territory, 1948.
Aspidiotus hederac (Vallot) on leaf of *Musa paradisiaca* L. var. *sapientum* Kuntze (banana) from Queensland.
Aspidiotus hederac (Vallot) on leaf of *Asimina triloba* from Queensland, 1950.
Chrysomphalus ficus Ashmead on fruit of *Citrus* sp. from Melville Island, Northern Territory, 1950.
Diaspis bromeliae (Kerner) on fruit of *Ananas comosus* Merr. (pineapple) from northern New South Wales, 1954.
Lepidosaphes beckii (Newman) on fruit of *Citrus limonia* Osbeck (lemon) from Queensland, 1948.
Lepidosaphes beckii (Newman) on fruit of *C. reticulata* Blanco (mandarin) from Queensland, 1948.
Lepidosaphes beckii (Newman) on fruit of *C. sinensis* Osbeck (orange) from Malta, 1953.
Lepidosaphes gloverti (Packard) on fruit of *Citrus* spp. from Darwin, 1950.
Phenacaspis sp. on leaves and fruit of *Mangifera indica* L. (mango) from Darwin, 1949.

Family COCCIDAE

- Ceroplastes rubens* Maskell on leaves of *Citrus* sp. from Victoria, 1948.
Coccus hesperidum Linn. on leaves of *Citrus* sp. from Alice Springs and Barrow Creek, Northern Territory, 1946.
Coccus hesperidum Linn. on leaves of *Ficus carica* Linn. (fig) from Alice Springs, 1948.

Family PSEUDOCOCCIDAE

- Dysmicoccus brevipes* Cockerell (= *Pseudococcus brevipes* (Cockerell)) on fruit of *Ananas comosus* Merr. from Magnetic Island, Queensland, 1954.

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